he then communicates it to the successor whom he had previously selected, and to whom he had already taught all the other rights and ceremonies pertaining to the dance.

The various liquids or 'medicine-waters' are not procurable by those not in the order, as they are very jealously guarded. Wiki, the high snake-priest, in an interview held after the dances at a ranch in the neighborhood, was quite communicative for a while, but, when this subject was approached, became very much agitated. He said, that, were he to reveal the secret of the preparation of these liquids, his life would be the penalty. Dr. Yarrow succeeded, however, in obtaining a bottle of the liquid used after the dance, and it is now in the army medical museum.

It should be mentioned that these liquids are not looked upon by the Indians as antidotes. The liquid taken after the dance has no direct bearing on the question of poison. In reply to Dr. Yarrow's question as to the object of this ceremony (the vomiting after the dance), Wiki told him that "the presence of the snake between the lips of the dancer caused a profuse flow of saliva, which the dancer was necessarily obliged to swallow, and that if he did not get rid of this saliva, which was poisonous, his stomach would swell up and burst," — an operation, it is hardly necessary to say, which never occurred from this cause; and the account must have been derived, therefore, from some source outside the facts of the case.

Mr. Trumble speaks of gorging on the part of the participants in the dance; he also says the snakes are fed until they become inert, and finds in these practices a partial preventive of evil effects from snake-bite.

Neither of these apply to the Moki dances. The performers go into the dance after four days of what is practically fasting (they eat but one meal each day); and the snakes themselves, so far as I could learn, are given nothing whatever to eat. It is true that in Wiki's accounts the phrase, "and I bathed him, and gave him to drink of the liquid," occurs; but the giving of drink is metaphorical, and consists of sprinkling the snake with the liquid by means of a feather.

I think the study of the rites pertaining to serpent-worship, as they occur among the lower races of mankind, would throw much light on the serpent-symbolism which prevailed among quite highly civilized people; the Egyptians, for example: but our knowledge of the early phases of this form of worship is rather meager. Perhaps the tribes mentioned by Mr. Trumble may supply some of the needed information.

A writer in *Harper's weekly* (March 25, 1882), quoted by Captain Bourke, gives an account of a performance very similar to the Moki dance, but occurring among some Central American tribes. In this ceremony each performer has his own particular snake, which he has previously trained, and with which he performs various feats. This, however, is jugglery, an element which is entirely lacking in the Moki performances. On this point I cannot do better than to quote Dr. Yarrow's closing remarks: "I went to Wolpi expecting to find a good deal of humbug about the snake-dance; I came away convinced of the earnestness and fair dealing of the people, and without a doubt that they fully believed that their ceremonies would bring about the desired result."

I think Mr. Trumble is mistaken about the effects of curari; but the word has been applied to so many different varieties of poison, that it has come to have a rather vague meaning. Curarine, the active principle of curari, is said to cause paralysis of the motor nerves, and it has been used in medicine as an antidote for strychnine and as a remedy in hydrophobia and in tetanus. But this part of the subject I must leave for those better qualified for the discussion. The subject has excited much interest; and many eminent investigators, from the days of Sir Walter Raleigh (who published his account in 1595) down to the present time, have given it their attention. Probably the most complete account is that published by Dr. S. Weir Mitchell and Dr. W. A. Hammond in the latter's 'Physiological memoirs,' 1863.

There is a point in Mr. Trumble's letter which seems to deserve special attention: this is the use, by Indians, of antidotes against poisons. To the savage there is no unknown: every thing is explained; and this explanation is always the most simple, the most direct, and, as a rule, the most superficial, that could be applied. The savage can no more realize the physical causes of phenomena than he can the laws which govern the solar system. Instances of this are furnished in abundance by the Moki myths; but they need not be quoted here, as they occur in all tribes, and can be found in any work treating on mythologic philosophy. The inability to realize the facts of physical causation, the grandest which have yet been discovered by man, is not confined to savages, however, but is present, in a greater or less degree, in what we are accustomed to call the highest civilization. It follows, then, that poison as a physical cause of death is a conception which is beyond the ken of the savage mind, and such is actually the case. Poison, when it is conceived of at all by savages, — and this conception is rarer than is generally believed, — is not thought of as a substance containing in itself its fatal properties, but as being endowed with them by some outside power, — either human, as in witchcraft, or else supernatural. The antidote to poison as thus conceived consists of an appeal to the same powers which produced the poison, or, in other words, to charms, or prayers, or incantations.

COSMOS MINDELEFF.

Prehensile-tailed salamanders.

It is not well to be hasty in accepting the idea that the tail of the salamanders is of so little value to them that they might get along quite as well without it. Observation proves the organ to be of constant use in pushing, when the animal makes its way among weeds, grass, rocks, or other obstructions. It is the main dependence of such as swim; and of climbing species its importance as a support and a lever is very manifest. Those suggested are general uses, common to all tailed batrachians. Particular species have the tail still more specialized. It is to some extent an organ for grasping in the long-tailed terrestrial species. A frequent practice of the 'spotted salamander,' Amblystoma punctatum, when taken up, is to curl the tail around the fingers or hand to prevent falling. Suspended thus, hanging head downward, it will again and again try to regain footing rather than drop. Peculiar serpentine curves, and the motions of the very flexible tip, often give the

tail of this species the appearance of feeling about for something, on its own account. The curves are so irregular at times, that the organ appears as if broken in several places. When at rest, some individuals have the habit of curling the tail closely against the body in a flat coil. Its capabilities are best seen in slender specimens, in which the tail is less thick and clumsy. Very likely Amblystoma jeffersonianum, and species of similar build, have the organ similar in sensitiveness and utility. Amblystoma mavortium, however, is lower in rank, and has the tail better adapted for swimming or pushing, as in other more aquatic forms. S. GARMAN.

Cambridge, Mass., June 27.

Association of official agricultural chemists.

The next meeting of this association will begin Thursday, Aug. 26, in the library of the Department of agriculture. All agricultural chemists holding official positions under the national or state governments, in agricultural colleges or experiment-stations, are entitled to membership. All other chemists interested in any way in the analysis of fertilizers or food-products are invited to attend the meeting, to present papers and take part in the discussion.

One of the chief objects of the association is to secure uniformity in methods of analysis employed. The attainment of such uniformity is of little less value than accuracy, in work of this kind.

I take this method of calling the attention of the chemists of the country, who are not members of the association, to the coming meeting.

H. W. WILEY,
Pres., and chairman of exec. com.

Washington, June 26.

Barometer exposure.

I have read with pleasure the paper referred to by Mr. Gilbert in his letter (*Science*, vol. vii. p. 571). His method seems to have shown, as clearly as could be without direct experiment, that the wind had the effect of lowering the barometer-readings in the building on Mount Washington. This direct evidence, if needed, has, I think, been supplied by the observations on Blue Hill, where it has been noticed, not only that the barometer in the building suddenly falls if the wind-velocity suddenly increases, but that during high winds the pressure in the building can be varied at will by merely opening and closing an aperture in the top of the building.

It does not seem unsafe, then, to draw one or two conclusions from these facts. In Loomis's tenth paper (*Amer. journ. sc.*, January, 1879), from an examination of a large number of storms, he arrives at the remarkable conclusion that "the low centre at the height of Mount Washington sometimes lags behind the low centre at the surface of the earth, apparently as much as two hundred miles." Mount Washington is only about one mile high; and if we draw two lines, — one to represent the earth's surface, and the other the storm-axis, — and make them diverge only one division in two hundred in length, the two lines will appear to the eye almost parallel. Such an inclination of the storm-axis seems incredible, and renders it probable that the apparent lagging was due to some other cause. Loomis shows, in this same paper, that the occurrence of high winds on Mount Washington from any easterly quarter is exceedingly rare; and in his eleventh paper he says, "In a majority of those cases in which an area of low barometer passes ever New England, attended by the usual system of circulating winds at the surface stations, this system of circulating winds does not extend to the height of six thousand feet." The effect of the indraught below only makes itself felt at the height of Mount Washington in front of storms by lessening the velocity of the prevailing westerly current, and in the rear of storms by increasing the velocity of this current.

This at once suggests that the apparent lagging of the storm-axis, or rather of the time of minimum pressure, on Mount Washington, is due to a mechanical effect of the wind on the observatory.

Mr. Gilbert has shown in his paper (pp. 531–533), from a series of observations, that wind-velocities of forty miles per hour from the north-west had the effect of lowering the pressure in the observatory on Mount Washington as much as eight-hundredths of an inch; wind-velocities of fifty miles, as much as thirteen-hundredths of an inch; and he estimated that wind-velocities of one hundred miles would lower it as much as half an inch. This equals any of the effects found by Loomis, and gives a plausible reason why the minimum pressure should occur later on Mount Washington than at sea-level. The same explanation applies to the lagging of the times of maximum pressure, since Loomis has shown in his second paper (*Amer. journ. sc.*, January, 1875) that the wind-velocities are larger in front than in the rear of maximum pressures.

Loomis also found that there was a lagging of the diurnal curves of pressure on Mount Washington and other mountains. He says in his tenth paper, "At the base of Mount Washington the principal maximum occurs at 8.30 A.M., but on the summit it does not occur until noon, being a retardation of three hours and a half."

Mr. Gilbert shows, on p. 526 of his paper, that from June 26 to June 28, 1873, some element on Mount Washington, which was undoubtedly the pressure, went through a diurnal variation coincident with the wind-velocity. During this time the wind each day reached a maximum near midnight, and a minimum near noon. This is a normal feature on high mountains; and if an increased wind-velocity tends, by a mechanical action on the building, to make the barometer read lower, it is readily seen that the pressure would tend to be lowest near midnight, and highest near mid-day. If, now, a double diurnal oscillation due to other causes be superposed on this, the chief maximum would occur much nearer noon than at lower stations, where the action of the wind is in the opposite direction.

The variations in the wind's velocity may not be the only cause of the phenomena considered in this letter. Loomis thinks that the wind-directions, and Ley that the upper cloud-motions, indicate a lagging of the storm-axis; and it seems probable that the expanding and contracting of the air from heat and cold have something to do with the occurrence of the chief maximum on mountains near noon, and in the lagging of the minimum pressure in storms; but the variations in the wind-velocity are undoubtedly an important factor, and it is very desirable that its influence might be eliminated.

H. HELM CLAYTON.

Blue Hill meteor. observ., June 28.